REMARKS

This application has been carefully reviewed in view of the above-referenced final Office Action, and reconsideration is requested in view of the following remarks. The Examiner's continued diligence in this application is greatly appreciated.

Applicant notes that the previous rejections of claims 1-17, 18-28 have been withdrawn in light of the arguments put forth in the response filed January 26, 2007 and new ground(s) of rejection have been given. The rejection of claims 29-32 has been withdrawn. The Examiner's diligence on this application is greatly appreciated.

Drawings

Applicant submits new sheets of drawings, Figures 6-9, to illustrate various methods described in the method claims. Applicant has additionally amended the specification to include reference to these figures. As the figures illustrate the subject matter of the claims as originally filed, no new matter has been added. These drawings are believed to be in compliance with 37 CRF 1.121(d).

Regarding the Rejections under 35 U.S.C. §103

Claims 1-3, 5, 9-16, and 19-28 are rejected as being unpatenable over Inuzuka in view of Geesen et al. Claims 6-8 and 17 are rejected as being unpatenable over Inuzuka in view of Geesen et al. and in further view of "Hartman et al." Applicant assumes that the 103 rejection of claims 6-8 and 17 is based upon the Kawata patent cited by the examiner and listed on PTO Form 892, U.S. 6,340,649, and not upon a patent to Hartman, for which a patent number has not been provided. Applicant respectfully traverses these rejections as follows:

The new grounds of rejection rely upon the references, Inuzuka and Geesen and Hartman et al, and asserts that the references, in various combination, teach all recitations of the claims. However, several elements of the claimed invention are not present in the cited references, whether considered singly or in combination. Particularly, the recitations of:

"a frequency generator that generates a local oscillator signal without use of a piezoelectric crystal;"

"an oscillator that generates the RF transmitter carrier signal without use of a piezoelectric element", or

"generating a local oscillator signal without use of a piezoelectric crystal",

or the like, found in various ones of the independent claims, is not taught, disclosed or suggested by the references, whether considered singly or in combination.

As noted in the previous two responses, generating a local oscillator signal without use of a crystal provides advantages in situations where very low device size and cost are paramount. The examiner is again respectfully directed to page 4, lines 3-10; page 6, line 20 to page 7, line 20; page 9, lines 7-12, 20-30; page 20, lines 7 on; as well as other portions of the specification, in which the use of and advantages associated with a frequency reference without the use of crystal materials is discussed.

The Geesen reference is relied upon in the rejection of the claims to cure the defect of the Inuzuka reference not teaching generation of a local oscillator signal without use of a piezoelectric crystal. A careful reading of the Geesen reference, however, does not support the Examiner's assertion that this element of the claims is met by Geesen. Geesen teaches that VCO oscillator 218 is part of a PLL 217 that is controlled by ultra-stable oscillator 228 (column 2, lines 50-66). In the paragraph beginning at column 3, line 3, Geesen teaches, "Because of the closed loop control afforded by PLL 217, the value of the frequency...does not depend on the conditions of aging of the VCO and the accuracy is that of the ultrastable oscillator." This is an acknowledgement that the PLL controls the frequency stability characteristics of the VCO and

thus it is the ultrastable oscillator 228, in combination with VCO 218, which generates signal 216.

Geesen teaches that the VCO 218 in PLL 217 can replace a TCXO and the associated D/A converter which tunes the TCXO, thereby increasing the scanning speed of the receiver. In this arrangement, control of the frequency of the VCO is accomplished by locking its signal to the output of the ultrastable oscillator 228 so that the frequency "does not depend on the conditions of aging of the VCO 218 and the accuracy is that of the ultrastable oscillator (228)" (column 3, lines 3-7 and 39-43). Gain variations due to component aging, for instance, is a concern addressed by using the faster VCO 218 (Abstract, column 3, line 6; column 8, lines 49-57) but proper operation of the PLL 217 still requires the use of ultrastable oscillator 228, which is used in combination with a fixed VCO, as opposed to a tunable frequency oscillator VCXO.

A careful reading of the Geesen reference supports the position that ultrastable oscillator 228 must be a crystal (piezo-electric) oscillator. Geesen controls his VCO 218 with a PLL 217 referenced to an "ultrastable oscillator 228." Because Geesen cites a tunable crystal oscillator as necessary, at column 3, lines 35-40, his PLL must need the frequency stability afforded by a crystal (piezo-electric) element. Moreover, given Geesen's comments at column 3, line 3, about the effect of the PLL on the VCO, it is reasonable to assume that the ultrastable oscillator 228 must have characteristics similar to those of a crystal, piezo-electric oscillator.

Additionally, it is fitting and informative to consider the state of the art of ultrastable oscillators at the time of filing of the Geesen reference, November 5, 1981, to further understand what Geesen must have meant by the term "ultrastable oscillator." The use of a PLL with a crystal reference is classic technology that was known when Geesen filed in 1981. It would have been unheard of to use a PLL topology without a crystal reference. The whole purpose of PLL synthesizer topology was to replace the multiple crystals formerly required for multiple-channel radios with a single crystal and a PLL to save space and cost. This view is supported by

literature in the relevant time period. Solid State Radio Engineering, Herbert L. Krauss, Charles W. Bastian and Frederick H. Arab, 1980, John Wiley and Sons, p. 180, states:

> The production of laboratory signal generators with wide frequency range (such as 1 to 500 MHz), good frequency stability, and accurate dial setting is difficult. ... The problem of frequency stability has also been solved through the use of PLLs to phase-lock the frequency source (in discrete frequency steps) to a crystal reference oscillator.

Even after the 1981 filing date of the Geesen reference, the 1982 publication "Phase Noise in Signal Sources," W. P. Robins, 1982, Peter Peregrinus, Ltd., London, paperback edition, 1984 (with minor corrections), reprinted 1991, reprinted 1996, p. 134, states,

> Synthesizers may be divided into three basic classes:
>
> (a) Non-coherent synthesizers which use more than one basic reference crystal or crystal oscillator.
> (b) Coherent synthesizers which use the method of direct synthesis.
> (c) Coherent indirect synthesizers which rely primarily on phase lock loops.
>
> Coherent synthesizers (types b and c) derive all their output frequencies from a single high quality crystal oscillator.

Relevant portions of both these references are included in the IDS that accompanies this filing.

Given both a careful reading of the Geesen reference as well as known discussions of relevant oscillator technology at the time of the Geesen filing, there is every reason to interpret the term "ultrastable oscillator" 228 as being a piezo-electric, crystal based oscillator. Furthermore, given that the use of a non-piezoelectric oscillator element at the time of filing of the Geesen reference would have been unusual and advantageous, Geesen certainly would have mentioned such an unusual arrangement if that had been contemplated. Clearly, it was not. And, as such a piezo-electric oscillator 228 effectively controls VCO 218, it cannot be said that VCO, even if it itself is non-piezo, generates a local oscillator signal without use of a piezoelectric crystal as required by the claims.

In addition to the above, Applicant respectfully renews the arguments put forth regarding the mitigation effects afforded by conversion prior to correlation discussed in the paper filed on August 2, 2006 at pages 11 and 12, which are herein incorporated by reference. The specification teaches that differentially detecting the signal prior to correlation, i.e. symbol matched filtering, is important in the mitigation of certain undesirable effects associated with the use of a non-piezoelectric crystal for generation of a local oscillator signal, such as frequency offsets and phase noise. The examiner is again respectfully directed to the following passages of the specification: page 5, lines 6-10, 15-26; page 7, lines 5-7, 10-15; page 13, line 19 to page 18 (in which a detailed treatment of frequency offset and phase noise mitigation is to be found); page 18, lines 8-11; page 20, lines 7-13, for example.

This aspect of the invention provides compensation for some of the more undesirable effects that might be encountered with the use of non-piezoelectric technology, which is inherently less stable than piezoelectric-based technology. In so doing, the invention provides a meaningful way to provide for the use of lower cost, noisier frequency references.

Applicant is appreciative for the indication that claims 29-32 are allowable and that claim 4 would be allowable if amended to be in independent form, including the limitations of all claims from which it depends. For the reasons set forth above, however, Applicant respectfully submits that claim 1, from which claim 4 depends, is allowable in its own right and thus respectfully declines to amend claim 4 to be in independent form at this time.

Concluding Remarks

The undersigned notes that other distinctions exist between the cited art and the claims. However, in view of the clear distinctions pointed out above, further discussion is believed to be unnecessary at this time. Failure to address each point raised in the Office Action should accordingly not be viewed as accession to the Examiner's position or an admission of any sort.

No amendment has been made to the claims in this response.

In view of this communication, all claims are now believed to be in condition for allowance and such is respectfully requested at an early date. If further matters remain to be resolved, the undersigned respectfully requests the courtesy of an interview. The undersigned can be reached at the telephone number below.

Respectfully submitted,

/Renee' Michelle Leveque/

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